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(FILE 'HOME' ENTERED AT 17:25:19 ON 12 DEC 2001)

FILE 'CAPLUS' ENTERED AT 17:25:25 ON 12 DEC 2001

FILE 'HCA' ENTERED AT 17:25:30 ON 12 DEC 2001

FILE 'HCAPLUS' ENTERED AT 17:25:38 ON 12 DEC 2001

L1 25340 CRYOGEN? OR SUB(1A)ZERO?
L2 337 L1 AND (TEMPERING OR TEMPERED)
L3 5855 BRAKE?
L4 0 L2 AND L3
E BRUNSON R W/IN,AU
L5 1 E5-6
SELECT L5 IPC 1
L6 28032 E1
L7 53 L6 AND L2

FILE 'WPIDS' ENTERED AT 17:30:09 ON 12 DEC 2001

L8 10 L7

FILE 'USPATFULL' ENTERED AT 17:30:43 ON 12 DEC 2001

L9 41 L8

AN 1981-54838D [30] WPIDS
TI Heat treatment of thick tool steel components - by quenching, **sub**
-**zero** treatment in organic solvents and **tempering**.

DC M24

IN FEOFANOVA, N S; SHILOV, V I; YUTROV, A P

PA (UYOD) UNIV ODESS

CYC 1.

PI SU 779421 B 19801115 (198130)*

PRAI SU 1978-2686236 19781121

AB SU 779421 B UPAB: 19930915

Tool steel articles over 20 mm. in thickness are heated-treated by quenching and **sub-zero** treatment.

To reduce surface cracking and internal stresses and save coolant, the articles are cooled by relative movement of the workpiece and the liquid agent at 1.2- 3.5 m/sec. until the surface layer reaches - 110 deg.C. The liquids used are organic solvents at below -120 deg.C, with a viscosity at -110 deg.C. of less than 0.1 kg/m.sec., e.g. low-temp. benzine and ether fractions, pentanes, pentenes, pentadienes.

Relative movement of article and coolant is achieved by rotating the article and mixing the coolant at the same time.

AN 1981-96579D [52] WPIDS
TI **Sub-zero** treatment of tool steels - includes repeated
immersion and isothermal holding in liquid nitrogen and its vapours.
DC M24
IN SHAMRIN, V M; SKOROMNAYA, Z A
PA (KOLE-I) KOLESNIKOV V P
CYC 1
PI SU 815051 B 19810323 (198152)* 4p
PRAI SU 1978-2662352 19780907
AB SU 815051 B UPAB: 19930915
The wear resistance of drills, milling cutters, etc. in steels such as U8, U10A, R6M5, KhVG, ShKh15, etc. is increased without loss of dimensional stability by the following heat treatment: cooling in liquid (e.g. acetone-alcohol mixture) from 20-80 deg.C. to +5 to minus 50 deg.C., initial cooling speed 20 deg./min., final speed 3 deg/min; isothermal holding 4-8 min; cooling to -40 deg.C. at 5-8 deg/min; isothermal holding 10-30 min; cooling to -120 deg.C. at 3-5 deg/min; isothermal holding 40-50 min; cooling to -160 deg.C. at 1.5-2.5 deg/min; removal from coolant for up to 5 min., maintaining temp. not above minus 145-160 deg.C; immersion in liquid nitrogen; holding 3-5 min; removal from liquid nitrogen for 2-3 min; heating to isothermal transformation threshold at 3-5 deg/min; holding 10-25 min; immersion in liquid nitrogen; holding 30 min; holding in liquid nitrogen vapour 10-20 hr., temp. variation 150 deg.C. at start of holding to 120 deg.C. at end; heating to room temp. at 2.5-3.5 deg/min; and **tempering**. Bul. 11/23.3.81.